AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1.(currently amended) ~~Method~~ A method for ~~the~~ realization of a confocal fluorescence in an *in vivo* and *in situ* image, ~~the method using~~ comprising:

employing an image guide made of several thousands of optical fibres; and ~~consisting of the~~

point by point scanning of a tissue in a subsurface plane, each point corresponding to an excitation signal emitted by a continuous source, deflected and injected into one of the optical fibres of ~~said~~ a bundle then focussed on [[the]] an exit of said fibre in said plane, each point emitting in return a fluorescence signal collected by said optical fibre, then detected and digitized to form an image element, ~~characterized in that~~ wherein the excitation signal is deflected at a speed corresponding to acquisition of a number of images per second sufficient for a real-time use and in that the fluorescence signal is detected at a detection frequency corresponding to a minimum sampling frequency of the fibres one-by-one.

2.(currently amended) ~~Method~~ The method according to claim 1, ~~characterized by~~ wherein a numerical aperture of the focussing optics is between approximately 0.5 and 1.

3.(currently amended) ~~Method~~ A method for [[the]] realization of a high-resolution fluorescence image, comprising:

~~using~~ employing an image guide made of several thousands of optical ~~fibres,~~ fibres;

emitting an excitation signal ~~being emitted by~~ from a continuous source, said excitation signal being deflected and injected by turns into one of the optical fibres of said image guide and a fluorescence signal emitted in response being collected by the same optical fibre as that used for the ~~excitation, then detected and digitized~~ excitation; and

detecting and digitizing to form an image element, ~~characterized in that the~~ wherein an end of the fibres is intended to be placed bare directly in contact with [[the]] a surface of [[the]] a tissue to be imaged, each fibre being able to produce a divergent beam which is able to excite a microvolume of tissue situated at the surface to a maximum depth depending in particular on [[the]] a core diameter of the optical fibres and in that the excitation signal is deflected at a speed corresponding to acquisition of a number of images per second sufficient for a real-time use and in that the fluorescence

signal is detected at a detection frequency corresponding to a minimum sampling frequency of the fibres one-by-one.

4.(currently amended) ~~Method~~ The method according to claim 1, ~~characterized in that~~ wherein the deflection speed of the excitation beam is adjusted by determining a rapid-resonance frequency of a resonating line mirror and a slow-resonance frequency of a galvanometric frame mirror.

5.(currently amended) ~~Method~~ The method according to claim 1, ~~characterized in that~~ wherein optical deflection, injection, focussing and detection means are used having a degree of achromaticity which allows the collection of photons over [[the]] a whole of [[the]] an emission band of the excited fluorophore.

6.(currently amended) ~~Method~~ The method according to claim 1, ~~characterized by~~ wherein a quantum efficiency of detection at the fluorescence wavelengths to be detected of at least 50 %.

7.(currently amended) ~~Method~~ The method according to claim 1, ~~characterized by~~ further comprising a prior step of detecting [[the]] a placement of the fibres of the image guide which are intended to be used.

8.(currently amended) ~~Method~~ The method according to claim 1, ~~characterized by~~ further comprising a prior step of determining [[the]] a real injection rate particular to each fibre.

9.(currently amended) ~~Method~~ The method according to claim 8, ~~characterized by~~ further comprising a prior step of determining [[the]] a collected flux corresponding to the background image.

10.(currently amended) ~~Method~~ The method according to claim 9, ~~characterized by~~ further comprising a step of correcting [[the]] a digitized signal coming from a fibre by subtraction of the flux corresponding to the background image and adaptation to the real rate of injection which is particular to said fibre.

11.(currently amended) ~~Method~~ The method according to claim 10, ~~characterized by~~ further comprising by a step of reconstructing [[the]] an image from the corrected signal.

12.(currently amended) ~~Method~~ The method according to claim 11, ~~characterized in that~~ wherein the step of reconstructing the image comprises a Gaussian low-pass filtering.

13.(currently amended) ~~Apparatus~~ An apparatus for *in situ* and *in vivo* ~~fibred~~ fibre optic confocal fluorescence imaging ~~for the implementation of the method according to claim 1~~, comprising:

- [[the]] an image guide (6);

- [[the]] a source (1) emitting continuously at the excitation wavelength of at least one targeted fluorophore,

- means for rapid scanning (4) and injection (5) fibre by fibre over time of [[the]] an excitation beam produced by the source (1) by lines and by columns in a XY plane corresponding to [[the]] an entry section of the image guide (6);

- means (3) for separating the excitation wavelength and [[the]] fluorescence wavelengths;

- means for detection (11) of [[the]] a fluorescence signal; and

- means (12) for processing the detected signal allowing [[the]] for realization of an image; and

an optical head (7) being arranged at [[the]] a distal end, intended to be brought into contact with [[the]] an observed tissue (13), allowing the excitation beam to be focused[[.]],

~~characterized in that~~ wherein:

- the scanning means are suitable for moving the excitation beam at a speed corresponding to [[the]] obtaining of an image in real time; and

- the detection means have a pass-band whose frequency is fixed as a function of [[the]] a minimum one-by-one ~~fibres~~ fibre sampling frequency.

14.(currently amended) ~~Apparatus~~ An apparatus for *in situ* and *in vivo* fibred high-resolution confocal fluorescence imaging ~~for the implementation of the method according to claim 3~~, comprising:

- [[the]] an image guide (6);

- [[the]] a source (1) emitting continuously at [[the]] an excitation wavelength of at least one targeted fluorophore,

- means for rapid scanning (4) and fibre-by-fibre injection (5) of [[the]] an excitation beam produced by the source (1) in a XY plane corresponding to [[the]] an entry section of the image guide (6);

- means (3) for separating [[the]] an excitation wavelength and [[the]] fluorescence wavelengths;

- means (11) for detecting [[the]] a fluorescence signal; and

- means (12) for processing [[the]] a detected signal allowing [[the]] realization of an image;

~~characterized in that the~~ wherein an end of each fibre is adapted for producing a beam which is divergent and is intended to be placed bare directly in contact with [[the]] a surface of [[the]] a tissue to be observed;

and in that the scanning means are suitable for moving the excitation beam at a speed corresponding to [[the]] obtaining of an image in real time; and the detection means have a pass-band whose frequency is fixed as a function of [[the]] a minimum sampling frequency of the fibres one-by-one.

15.(currently amended) ~~Apparatus~~ The apparatus according to claim 13, ~~characterized in that~~ wherein the excitation beam produced by the source (1) is ~~of the~~ a longitudinal monomode [[type]] beam presenting an optimum wave front quality for [[the]] injection into a slightly multimode optical fibre.

16.(currently amended) ~~Apparatus~~ The apparatus according to claim 13, ~~characterized in that, the~~ wherein a section of a fibre being circular, the excitation beam produced by the source is circular so as to optimize [[the]] an injection into a fibre.

17.(currently amended) ~~Apparatus~~ The apparatus according to claim 13, ~~characterized by~~ further comprising means (2) for shaping the beam used on [[the]] an exit of the source (1) in order to shape the excitation beam so as to adapt [[it]] the excitation beam to the injection means (5) in the image guide (6).

18.(currently amended) ~~Apparatus~~ The apparatus according to claim 13, ~~characterized in that~~ wherein the means for separating the excitation and fluorescence wavelengths comprise a dichroic filter (3) having a maximum efficiency at the excitation wavelength.

19.(currently amended) ~~Apparatus~~ The apparatus according to claim 13, ~~characterized by~~ further comprising rejection means (8) placed upstream of the detection means (11) and suitable for eliminating the excitation wavelength.

20.(currently amended) ~~Apparatus~~ The apparatus according to claim 13, ~~characterized in that~~ wherein the scanning means (4) comprise a resonating line mirror (M1), a galvanometric frame mirror (M2), a first afocal optical system (AF1) with unitary magnification adapted for the conjugation of the two mirrors and a second afocal system (AF2) with unitary magnification adapted for the conjugation of [[the]] rotation planes of the two mirrors with the injection plane in one of the fibres.

21.(currently amended) ~~Apparatus~~ The apparatus according to claim 13, ~~characterized in that~~ wherein [[the]] optical means of the optical head (7), the scanning means (4), the injection means (5) and the detection means (11) present a degree of achromaticity adapted for [[the]] collection of [[the]] photons

over [[the]] a whole of [[the]] a width of [[the]] a spectral band of the fluorescence signal.

22.(currently amended) ~~Apparatus~~ The apparatus according to ~~one of claims 13 to 22~~ claim 13, ~~characterized in that~~ wherein the injection means (5) comprise two optical units (E1, E2), the first unit (E1) being adapted for correcting [[the]] optical aberrations at [[the]] an edge of [[the]] a field of the scanning means (4) and the second unit (E2) being adapted for carrying out [[the]] an actual injection in one ~~of the fibres~~ fibre of the image guide (6).

23.(currently amended) ~~Apparatus~~ The apparatus according to claim 22, ~~characterized in that~~ wherein the first optical unit (E1) comprises a doublet and the second optical unit (E2) comprises two doublets followed by a lens.

24.(currently amended) ~~Apparatus~~ The apparatus according to claim 13, ~~characterized by~~ further comprising a filtering hole (10) placed in front of the detection means (11) whose diameter is chosen so that the image of a fibre fits into [[it]] said diameter.

25.(currently amended) ~~Apparatus~~ The apparatus according to claim 24, ~~characterized by~~ further comprising means (9) for focussing the fluorescence signal on the filtering hole (10).